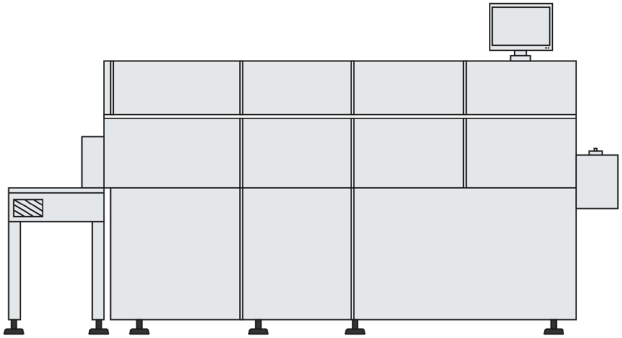
Made in USA

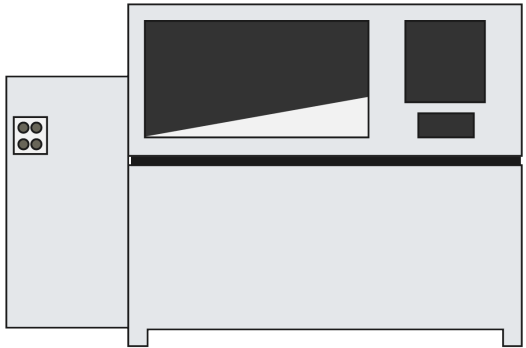
60 Years of Excellence, and Still Growing Strong

ECD PRODUCT CATALOG

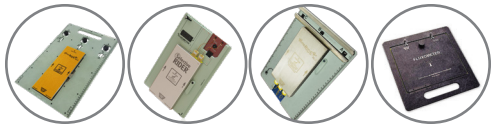
ECD SOLUTIONS FOR

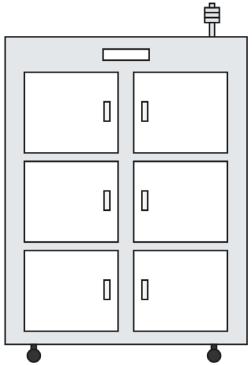


PROCESS DEVELOPMENT & VALIDATION

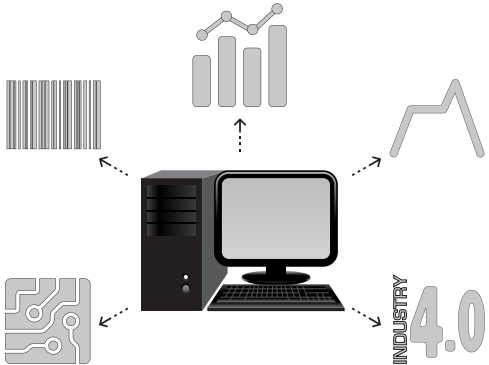


MACHINE QUALITY MANAGEMENT





COMPONENT DRY STORAGE



USER INTERFACE ANALYSIS & OPTIMIZATION

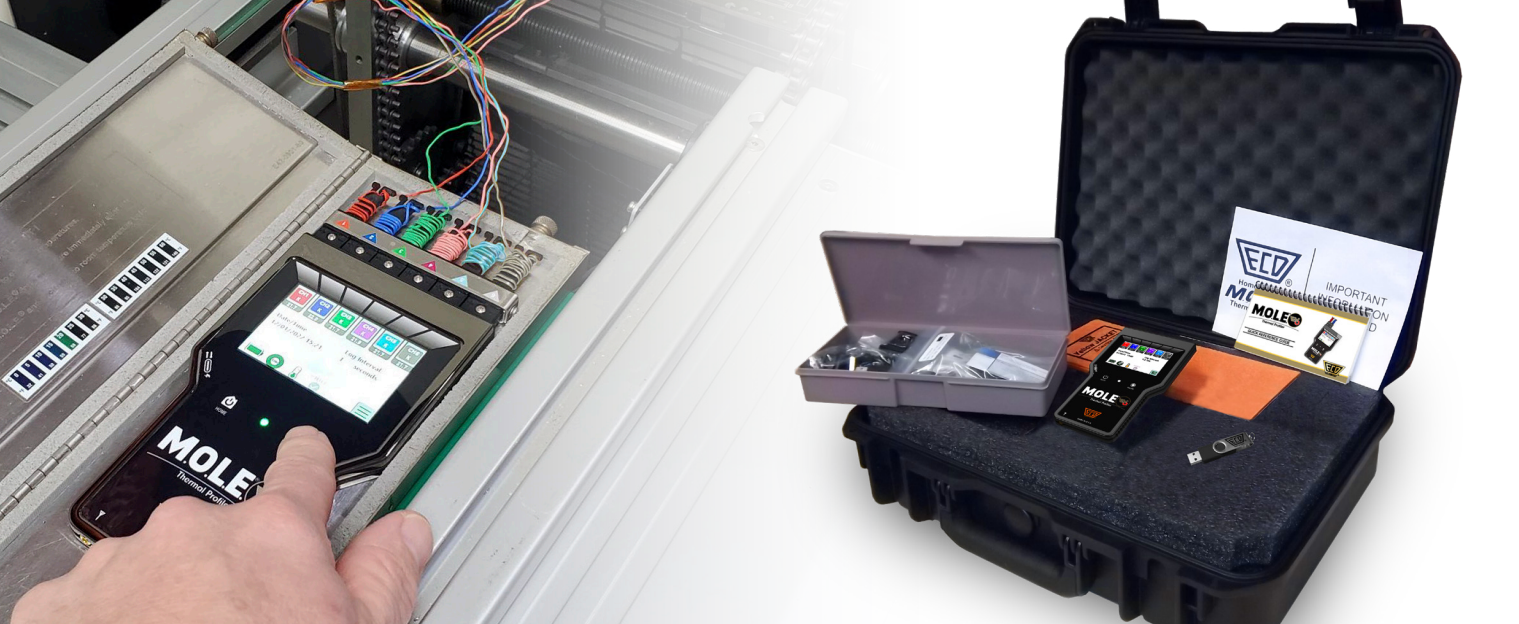
M.O.L.E.® EV6

- On-screen instrument status display:
  - » Live temperature readings
  - » Thermal profile
  - » KPI table
- Built-in calibration reminders
- Battery life/charge indicators
- Memory status indicator
- 6 thermocouple inputs
- Supports multiple thermocouple types
- Sampling at up to 100 samples per second
- USB-C communications and charging
- Two-button control (on/off and record)
- Wireless operation with Class 1 Bluetooth® RF 5.1 LE

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

MACHINE QUALITY MANAGEMENT
[REFLOW, WAVE & SELECTIVE SOLDERING]

ecdusa.co/mev6



M.O.L.E.® EV6

M.O.L.E.® EV12

M.O.L.E.® EV12
Thermal Profiler

- On-screen instrument status display:
  - » Live temperature readings
  - » Thermal profile
  - » KPI table
- Built-in calibration reminders
- Battery life/charge indicators
- Memory status indicator
- 12 thermocouple inputs organized into two groups of five channels
- Supports multiple thermocouple types
- Sampling at up to 50 samples per second
- USB-C communications and charging
- Two-button control (on/off and record)
- Wireless operation with Class 1 Bluetooth® RF 5.1 LE

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

ecdusa.co/mev12

M.O.L.E.® EV12

M.O.L.E.® EV20

M.O.L.E.® EV20
Thermal Profiler

- On-screen instrument status display:
  - » Live temperature readings
  - » Thermal profile
  - » KPI table
- Built-in calibration reminders
- Battery life/charge indicators
- Memory status indicator
- 20 thermocouple inputs organized into four groups of five channels with standard mini-connectors
- Supports multiple thermocouple types
- Sampling at up to 20 samples per second
- USB-C communications and charging
- Two-button control (on/off and record)
- Wireless operation with Class 1 Bluetooth® RF 5.1 LE

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

ecdusa.co/mev20

M.O.L.E.® EV20

V-M.O.L.E.™ 2

V-M.O.L.E.™ 2 Thermal Profiler

- Indicators identify if critical systems are “GO” before profiling:
  - » Internal battery voltage is low
  - » Internal temp is at or above a threshold
  - » Memory is full
  - » All channels are OFF
- 4 thermocouple inputs with standard mini-connectors
- Supports multiple thermocouple types
- Sampling at up to 100 samples per second
- USB-C communications and charging
- Two-button control (on/off and record)

NEW

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

ecdusa.co/vm2

V-M.O.L.E.™ 2

V-M.O.L.E.™ 2 SOLAR

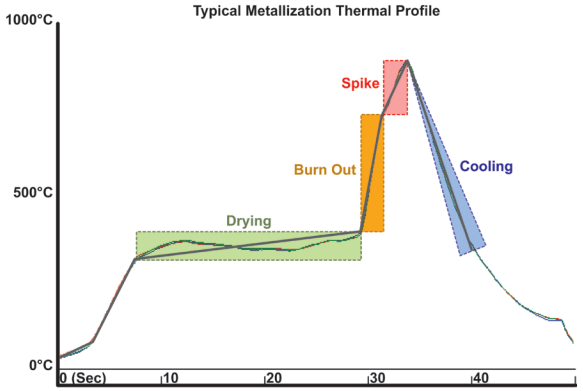
- 4-channel profiling solution that enables quality assurance measurement during Metallization and Lamination Press Photo Voltaic processes
- 17mm [0.7"] reflective stainless steel thermal barrier
- Stainless steel-sheathed, Type K mini thermocouples
- Indicators identify if critical systems are "GO" before profiling:
  - » Internal battery voltage is low
  - » Internal temp is at or above a threshold
  - » Memory is full
  - » All channels are OFF
- USB-C communications and charging
- Two-button control (on/off and record)

NEW

SOLAR CELL METALLIZATION

ecdusa.co/vm2-solar

Solar Cell Metallization Process



The typical process in short time (40-60 seconds); ramping quickly to Peak.

V-M.O.L.E.™ 2 SOLAR

OvenSENTINEL®

- Full-Featured Traceability: Local and remote database support
- Continuous Quality Monitoring: Precise PASS/FAIL for every board
- Dynamic Measurement Capabilities: Open architecture that is integration-ready for future measurement needs
- OvenSENTINEL® Software: Trusted traceability with patent-pending TrueProfile™ technology
- Industry 4.0+: Easy integration and full-featured reporting delivers actionable data and deep analytics
- 24-hour oven monitoring
- Process Data Archiving and Playback
- Automatic Statistical Process Control Charting
- Out-of-Specification Alarm

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING]

ecdusa.co/os

TrueProfile™

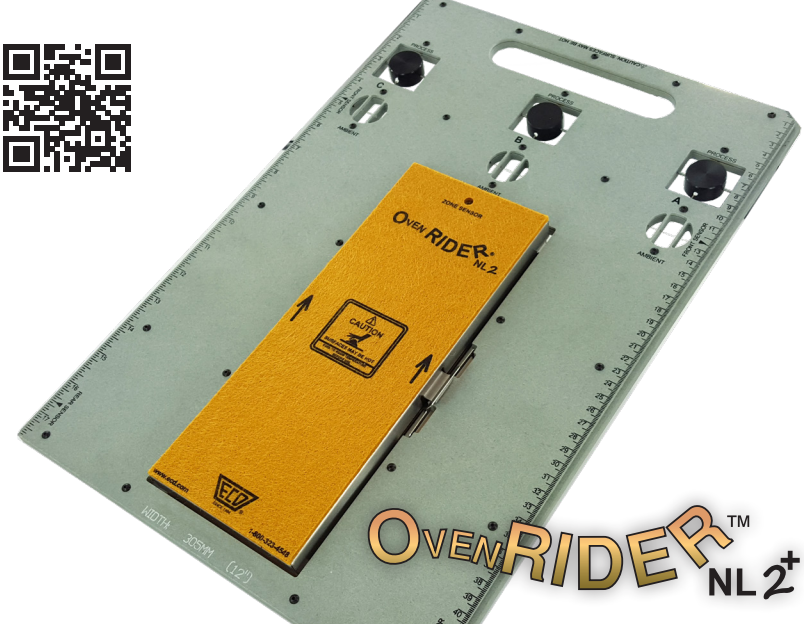
- The TrueProfile™ process tracks the PCB through the oven and records the temperatures that the board actually experiences. These temperatures are used to generate a single dynamic profile from which KPI measurements are taken. This method is superior because it records the actual zone temperatures at the time the board was in each zone, versus a single view or group of snapshots at of single moments in time. TrueProfile also enables identification of specific board(s) that failed specification, rather than scrapping all boards in the oven during a certain time.

Good Profile (OK)

Bad Profile (Not OK)

OvenSENTINEL®

OvenRIDER® NL 2+



- Industry standard 6-channel convection reflow oven verification platform
- Provides SPC-driven Go/No-Go oven readiness to process engineers, operators and maintenance technicians
- Verifies heat flow, temperatures and conveyor speed across the oven
- Superior alternative to 'Golden Board' as a first-off (thousands of runs).
- Available in 168mm [6.6"], 305mm [12"], & 458mm [18"] as well as custom widths
- Powered by the 6-channel M.O.L.E.® EV6 or SuperM.O.L.E.™ Gold 2 & M.O.L.E.® MAP 3

MACHINE QUALITY MANAGEMENT
[REFLOW SOLDERING]

ecdusa.co/or

OvenRIDER® Data Table:

- Table is specialized for reflow oven applications. Group parameters are color-coded, so views on other page tabs can be easily associated with label parameters.

Features:

1. Oven Summary Data
2. M.O.L.E.® Status
3. Individual Temperature and Process Delta Zone Data

OvenRIDER® NL 2+

SelectiveRIDER®

Selective RIDER®

- Dynamic X/Y Sensor measures both X and Y position from target center in addition to fountain diameter while touching the bottom of the pallet.
- Height Sensor measures fountain height as referenced from the bottom of the pallet.
- Mini Fluxometer® included with the kit are two test mesh types; V-Gauge (Vernier) and UP (Uniformity & Penetration) along with three types of test paper.
- Powered by the 6-channel M.O.L.E.® EV6 or SuperM.O.L.E.™ Gold 2 & M.O.L.E.® MAP 3

MACHINE QUALITY MANAGEMENT
[SELECTIVE SOLDERING]

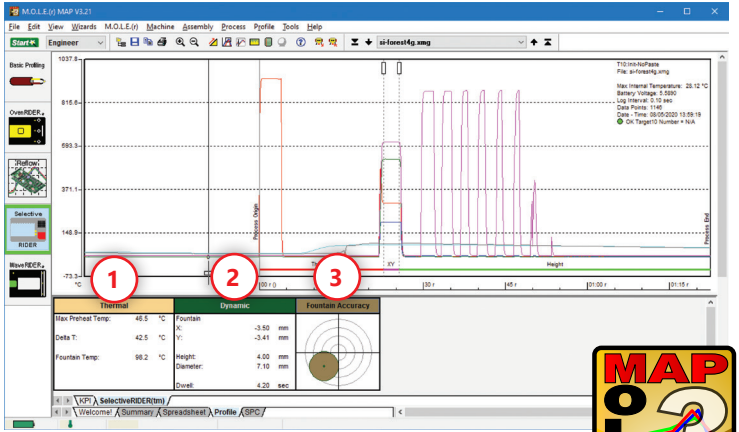
ecdusa.co/sr

SelectiveRIDER® Data Table:

- All meaningful measurements are presented on the “Summary” sheet
- Pictorial fountain accuracy display
- No need to look at “Profile”
- All runs are stored in “Spreadsheet” as normal
- Out of specification measurements highlighted blue or red
- SPC of all parameters as usual

Features:

1. Thermal
2. Dynamic
3. Fountain Accuracy



SelectiveRIDER®

WaveRIDER® NL 2

- Daily confirmation of product recipe performance on the wave soldering system
- Use as a physically stable alternative to a “Golden Board” as a as verification at the beginning of every shift (Go/No-Go readiness)
- Process sensors quantify parallelism, dwell time in wave(s) immersion depth and conveyor speed
- Replaceable Test Coupon measures solder, top and bottom-side temperatures
- Powered by the 6-channel M.O.L.E.® EV6 or SuperM.O.L.E.™ Gold 2 & M.O.L.E.® MAP 3

MACHINE QUALITY MANAGEMENT
[WAVE SOLDERING]

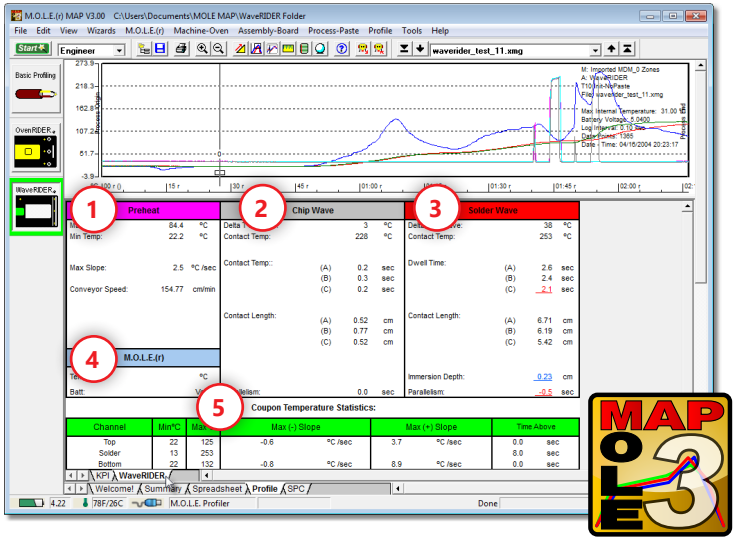
ecdusa.co/wr

WaveRIDER® Data Table:

- Specialized for wave soldering machine applications. Group parameters on the data sheet are color-coded for easy label parameter association within other page tabs.

Features:

1. Pre-heat Parameters and Conveyor Speed
2. Chip Wave Parameters (Blank column if there is no chip wave)
3. Solder Wave Parameters
4. M.O.L.E.™ Internal Status
5. Overall Coupon Parameters



WaveRIDER® NL 2

FLUXOMETER®

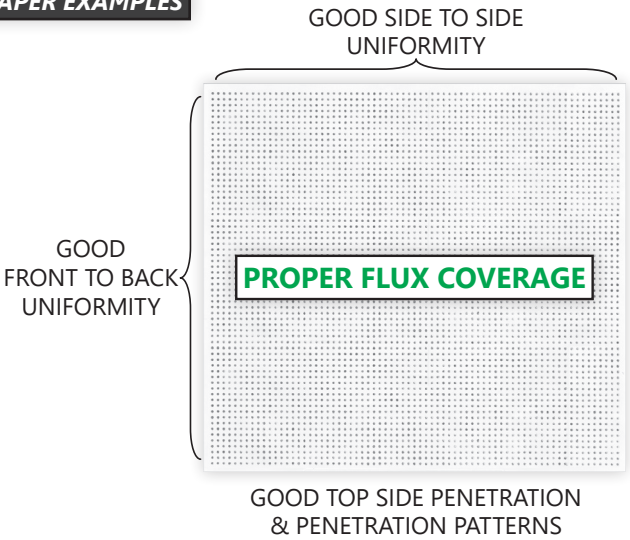
FLUXOMETER®

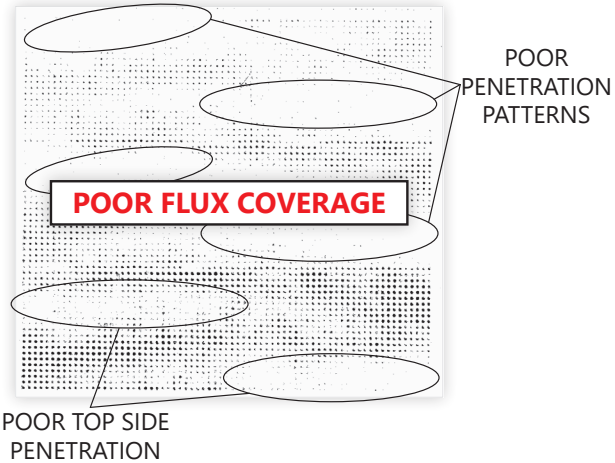
- Quickly displays spray flux top side penetration and pattern uniformity to ensure proper setup and maintenance
- Sprayed flux through a sandwiched through-hole mesh reveals an easy to read and comparable signature on the test paper to enable machine adjustments
- Ensure proper deoxidation and wetting throughout the width and length of wave soldered products
- Place on to conveyor similar to a product run and retrieve prior to preheater if a product recipe is active

MACHINE QUALITY MANAGEMENT
[WAVE SOLDERING - FLUX]

ecdusa.co/fom

TEST PAPER EXAMPLES





FLUXOMETER®

SmartDRY®

SmartDRY®

Intellegent Dry Storage

- Market-leading recovery time of <3 minutes provides constant access to stored parts
- Immediate visual confirmation of dry storage status
  - » OK = Green
  - » Working = Yellow
  - » Alert = Red
- J-STD Performance: Achieves more than just compliance with innovative regeneration
- Selection of volume sizes to suit your needs
- Industry 4.0 Ready: Integrated network tracks events from all SmartDRY® cabinets for access to data on connected devices.

COMPONENT DRY STORAGE

ecdusa.co/sdry

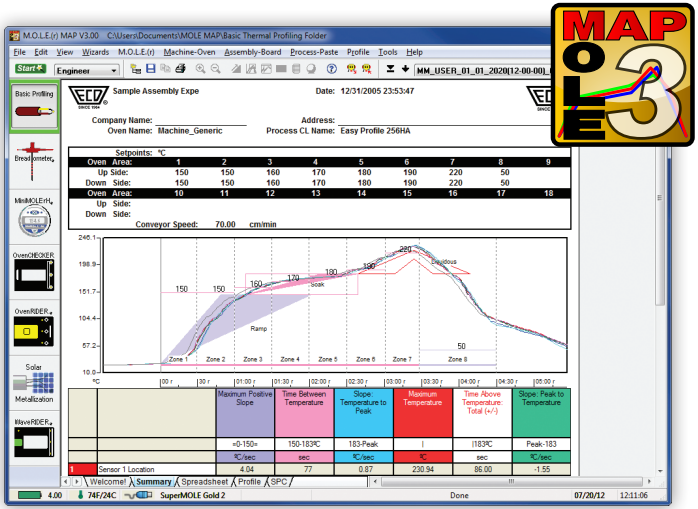
INTUITIVE NETWORK DASHBOARD

READINESS LIGHT STATUS

ADAPTABLE SHELVING

SmartDRY®

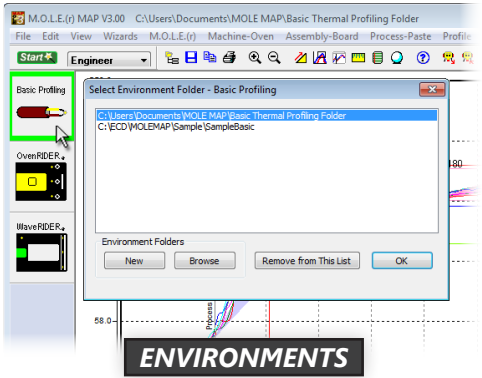
M.O.L.E.® MAP

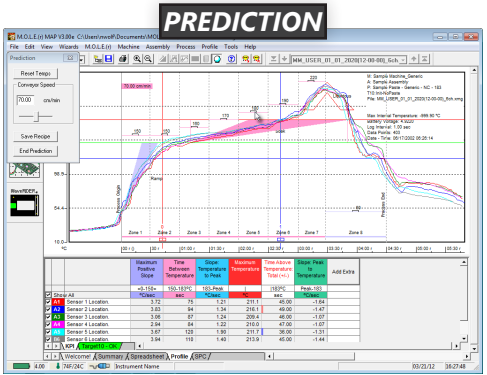


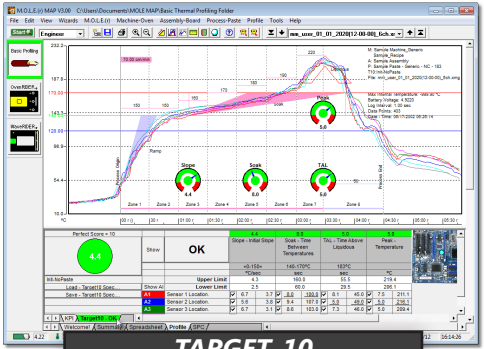
- With MAP 3 any ECD sensor package input to any ECD M.O.L.E.® operates within a unique 'Environment' attuned to the profiling job at hand – all within the same program!
- WaveRIDER® NL2, OvenRIDER® NL2+, SelectiveRIDER® and other platforms all operate within a unique M.O.L.E.® MAP Environment
- Special Profile Tab sets up the M.O.L.E.s patented "OK" button for Target-10, Bake-S, and Relative Humidity, etc.
- Flexible: Interactive Prediction is a great assist for recipe development. You can make quick adjustments to a profile just made or any run in any MAP Directory
- Robust: Process documentation complete with Oven and Solder Paste Databases you can easily add to, Preferences can be set once or customized to various product and production lines.

USER INTERFACE ANALYSIS & OPTIMIZATION
[REFLOW, WAVE & SELECTIVE SOLDERING]

ecdusa.co/map


M.O.L.E.(r) MAP V3.00 C:\Users\Documents\MOLE MAP\Basic Thermal Profiling Folder
File Edit View Wizards M.O.L.E.(r) Machine-Oven Assembly-Board Process-Paste Profile
Start
Engineer
Basic Profiling
OvenRIDER
WaveRIDER
Select Environment Folder - Basic Profiling
C:\Users\Documents\MOLE MAP\Basic Thermal Profiling Folder
C:\ECD\MOLEMAP\Sample\SampleBasic
Environment Folders
New
Browse
Remove from This List
OK
ENVIRONMENTS

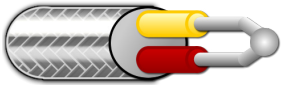

PREDICTION
Reset Temps
Conveyor Speed
70.00 cm/min
Save Recipe
End Prediction
Maximum Positive Slope
Time Between Temperatures
Slope Temperature to Next
Maximum Temperature
Time Above Temperature Total (+/-)
Slope Peak to Temperature
Add Extra
Sensor 1 Location
Sensor 2 Location
Sensor 3 Location
Sensor 4 Location
Sensor 5 Location
Sensor 6 Location
Welcome! Summary Spreadsheet Profile SPC


M.O.L.E.(r) MAP V3.00 C:\Users\Documents\MOLE MAP\Basic Thermal Profiling Folder
Start
Engineer
Basic Profiling
OvenRIDER
WaveRIDER
Peak
Slope
Soak
TAL
Ramp
Cool
Zone 1
Zone 2
Zone 3
Zone 4
Zone 5
Zone 6
Zone 7
Zone 8
Perfect Score = 10
4.4
Show
OK
Sn63 / Pb37
Lead - Target115 Spec
Silver - Target178 Spec
Upper Limit
Lower Limit
Sensor 1 Location
Sensor 2 Location
Sensor 3 Location
Welcome! Summary Spreadsheet Profile SPC
TARGET-10

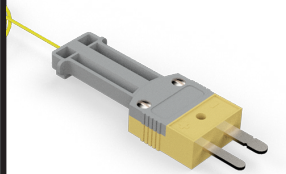
M.O.L.E.® MAP

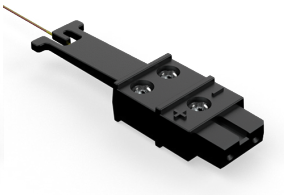
THERMOCOUPLES

PFA	GLASS	OVERBRAID



MINI	MICRO	NANO





- Available in a wide variety of insulation types and temperature ratings to suit application requirements
- Wide availability of stock and offer a full range of K-type thermocouples with PFA (Teflon®), glass, glass with overbraid and stainless/inconel sheath in various lengths and wire diameters
- Micro, Nano and Mini connector styles available
- ECD sells only special-limits-of-error grade thermocouple wire
- Maintain measurement integrity of measurements by replacing thermocouples at the first sign of nicks, kinks or severed junction
- Easy ordering through ECD's online catalog

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

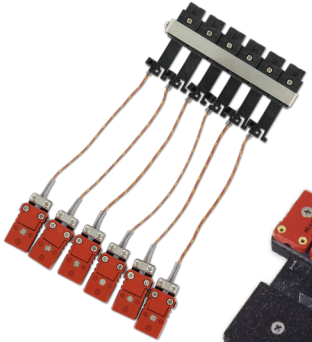
ecdusa.co/tc

- Adapts mini-terminated K-Type thermocouples to ECD Micro Gold & Nano styles
- One-piece and individual channel adaptors
- Available in Teflon® and glass wire insulations for high-temperature lead-free work. The glass wire and high-temperature mini connectors are rated to 482°C [900°F]

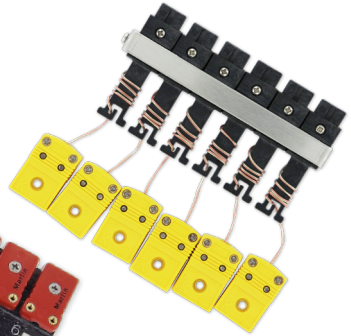
PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

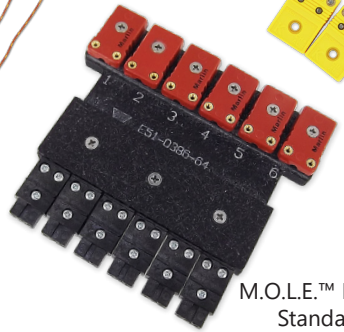
ecdusa.co/tcadaptors

M.O.L.E.™ EV6/SuperM.O.L.E.™ Gold 2
Standard Mini Adaptor (Glass)



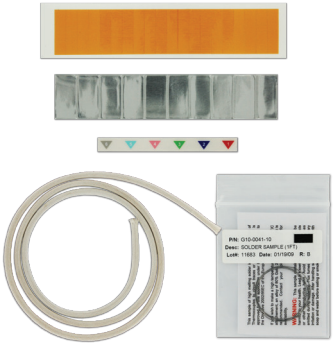
M.O.L.E.™ EV6/SuperM.O.L.E.™ Gold 2
Standard Mini Adaptor (Teflon®)





M.O.L.E.™ EV6/SuperM.O.L.E.™ Gold 2
Standard Mini Adaptor (Rigid)

THERMOCOUPLE ADAPTORS



- High-Temperature Solder Sample (Sn05Pb93)
- Aluminum T/C Tape:
  - » Roll & 12.7mm [0.5"] x 25.4mm [1"] pieces
- Polyamide (Kapton) T/C Tape:
  - » Roll & 12.7mm [0.5"] x 25.4mm [1"] pieces
- Instant Adhesive
- Takpak Spray Accelerator
- T/C Fiberglass Sleeving Organizer

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

ecdusa.co/tcattach

ECD has added a new vapor phase reflow sealed barrier to the portfolio. The M-VP™ completes the ECD line-up, which now enables profiling of any soldering process – wave, reflow, selective, or vapor phase.

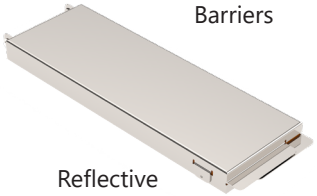
- Upgrade your exising barrier to keep the thermal profiler cooler for longer or hotter process specs to extend your thermal profiler value.
- Time at Temperature and vertical above belt clearance drive the thermal barrier selection for the specific application.
- Replace your original barrier or purchase an additional one to increase the number of thermal profiling runs.

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

ecdusa.co/tb

260L | 395L | 460L
Barriers

M-VP™
(*New*)

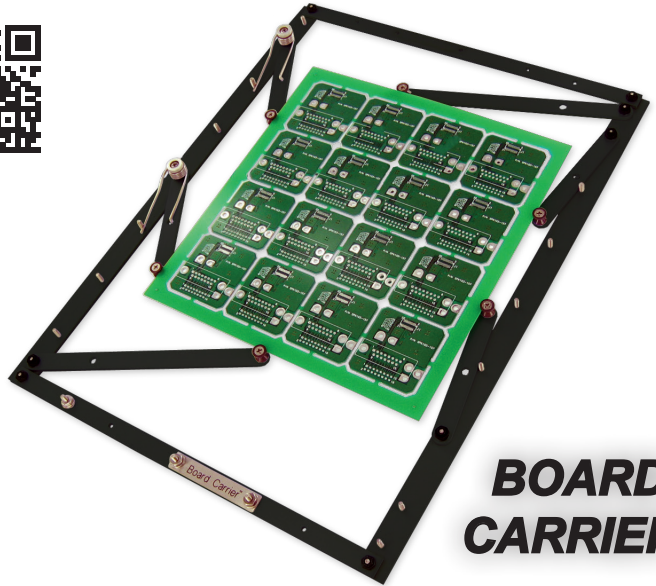


Reflective

BB-50

THERMAL BARRIERS

BOARD CARRIER™



BOARD CARRIER™

- All BOARD CARRIERs feature four adjustable arms. Two of the arms can be pivoted and locked to position the board in the middle of the frame. The two opposing arms are spring loaded to grip the board firmly and to permit quick board replacement.
- Standard and Large size BOARD CARRIER™ are available for reflow and wave solder applications.
- Large BOARD CARRIER™s have two additional long arms to support the leading and trailing board edges.
- All BOARD CARRIER™ arms can be repositioned along the side rails to adapt to the length of the circuit board.
- For save solder machines, BOARD CARRIERs are manufactured of clear, hard anodized aluminum for resistance to flux.

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

ecdusa.co/bc

Reflow Profiling

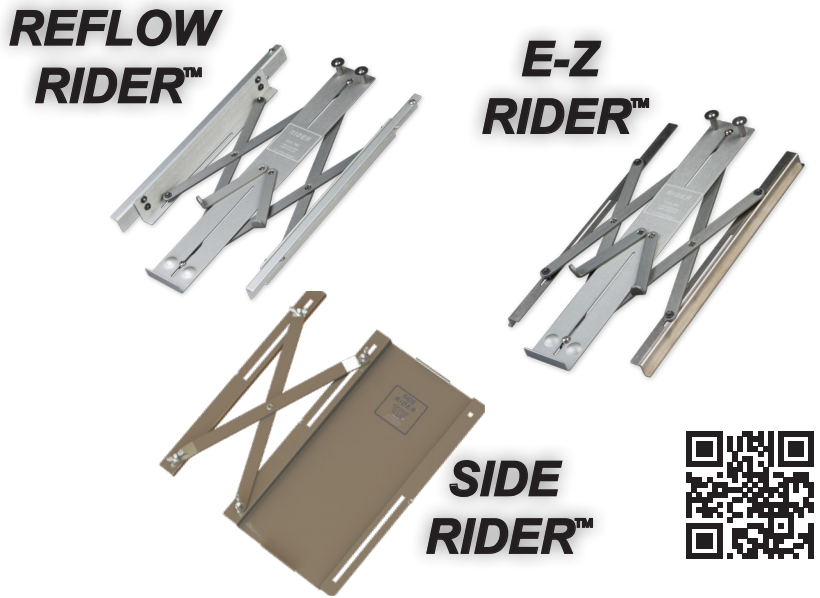
- SIDE RIDER™: Can be used alone for narrow rail widths or with an outrigger, an expandable rugged, metal frame with scissors action extension.
- REFLOW RIDER™: Built of high quality materials for reliable operation and long life. The side rails, arms and support deck are hard-anodized aluminum. All fasteners are stainless steel.

Wave Soldering

- E-Z RIDER™: Designed to carry your profiler safely through wave solder machines. E-Z Rider's titanium side rails are gripped by the finger conveyors, and support the profiler well above the solder wave.

PROCESS DEVELOPMENT & VALIDATION
[REFLOW SOLDERING & IN-LINE CURING]

ecdusa.co/pc



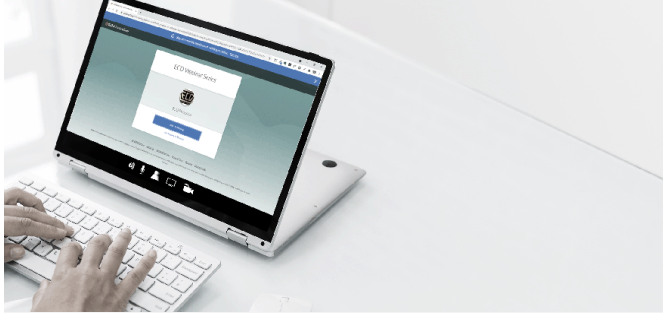
PROFILER RIDERS

PAPERS | WEBINARS

A Wealth of Information is Yours for the Taking.

ECD's decades of expertise in the electronics, baking, and dry storage disciplines is unmatched. And we've written a lot about thermal profiling, soldering best practices, process monitoring protocols, and more. An entire library of white papers is on our site and at your fingertips. Tap into our team's technical expertise.

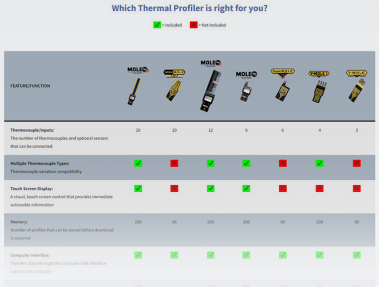
ecdusa.co/papers



Straight from the Source!

If you want to know more about ECD's latest products, how to use them most effectively, and get helpful technology tips to improve outcomes, check out our webinar series. From thermocouple selection to measure and manage the accuracy of your soldering equipment, this webinar series has it all. Watch now.

ecdusa.co/webinars



Get the Latest Technology for Less!

Anyone in the electronics market knows how fast things change. That's true for thermal profiling, too. ECD has innovated numerous M.O.L.E.® thermal profilers over the years, bringing new capability and ease-of-use with each design. Our latest platform – the touchscreen M.O.L.E. EV – is a breakthrough for time savings and performance. We want to make it easy for you to have the most current tech, so ECD has implemented an attractive trade-in program. Check out all the details here!

ecdusa.co/tradein

Your Profiler May Need a Reset.

Regular maintenance is key for optimal operation. Check your thermal profiler calibration records to verify if it's time for a tune-up. ECD's accredited lab can calibrate your profiler to spec and have it back to you in no time!

ecdusa.co/calibrate

TRADE-IN | SERVICE

Made In USA

The trapezoidal ECD logo®, M.O.L.E.® (Multi-Channel Occurrent Logger Evaluator), M.O.L.E.® EV6, M.O.L.E.® EV12, M.O.L.E.® EV20, Fluxometer®, OvenRIDER® NL 2+, OvenSENTINEL®, SmartDRY®, SelectiveRIDER®, WaveRIDER® NL 2 are registered trademarks of Electronic Controls Design, Inc. Board Carrier™, E-Z Rider™, M-VP™, Reflow Rider™, Side Rider™ and V-M.O.L.E.™ 2 are trademarks of Electronic Controls Design, Inc.

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ECD WORLD HEADQUARTERS
(North America - US, Canada)
4287-B SE International Way
Milwaukie, Oregon 97222 U.S.A.
Tel: +1 800 323 4548
E-Mail: sales@ecd.com
Web: www.ecd.com

APAC
(Asia-Pacific, China, India)
Singapore Office
Mobile: +65 9692 6822
E-Mail: ecd.asia@ecd.com

EMEA
(Europe, Middle East, Africa)
UK Office
Mobile: +44 (0) 7903 252560
E-Mail: ecd.europe@ecd.com

LATAM
(Mexico, Central, South America)
Houston, TX U.S.A. Office
Phone: +1 503 659 6100 x 250
Mobile: +1 832 533 0046
E-Mail: ecd.latam@ecd.com

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